Hobbies WEEKLY

CONTENTS

FREE DESIGN WAGON AND HORSES TOY

July 12th, 1950 Price Fourpence Vol. 110 No. 2854

How the home handyman can

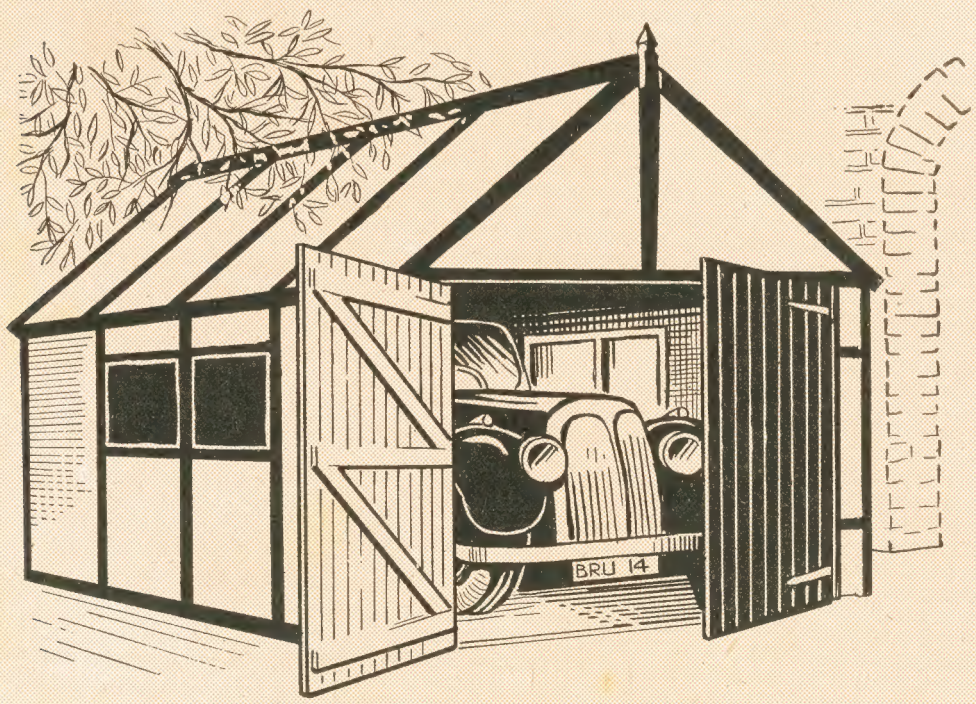
BUILD A GARAGE

THE garage described in this series of articles is 14ft. long by 7ft. 9ins. wide. This is a popular size, being large enough to accommodate many of the 8 h.p. and 10 h.p. cars and even some 12 h.p. cars. The plan for making has been simplified, eliminating all unnecessary work without sacrificing strength and durability. Most of the framework is made of 2in. by 2in. scantling and details are given in the cutting list of the lengths required for each section. If the instructions are followed carefully, a good professional looking job will be the result.

Making the Front Section

Fig. 1 shows the positions of the pieces which form the front section. First cut the four (A) pieces, these are 5ft. 10ins. long, and then cut the two (B) pieces, 7ft. 9ins. long. Cut the eight 3½in. pieces (E) from the bits left over. It is important that the ends are cut perfectly square, otherwise the frame will be out of shape when assembled. This point applies right through these instructions.

In the cutting list the two pieces (D) are given as 5ft.; this is to give sufficient material for cutting the angles correctly. Mark out and cut as shown in Fig. 2. The same lengths are used for the rear section and the intermediate roof supports, ten pieces in all, the centre pair being made of 3ins. by 2ins. It is advisable to cut all these pieces at this stage, making the length and angles exactly the same. This will ensure a good straight roof. The piece (C) for the front section is shown as 3ft. in the cutting list. Mark out and cut as shown in Fig. 3.



To assemble the front section, take up the two pieces (B) and drill the ends to take the nails. This simple precaution should be carried out whenever nails are driven across the grain at the end of a length. Split ends must be avoided at all costs. Nail in position the four pieces (A), using two 4in. nails at each end. The pieces (E) should be placed in

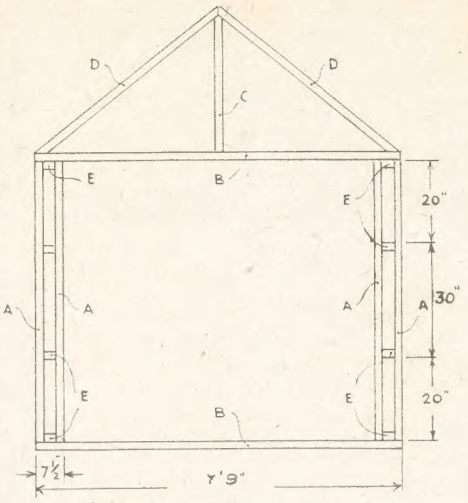


Fig. 1—Framework of front section

Illustration of various stages of the work

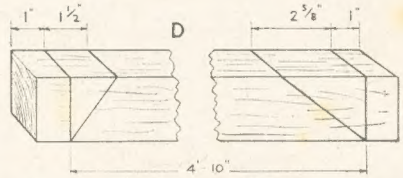


Fig. 2—Angle piece front section cutting two pieces

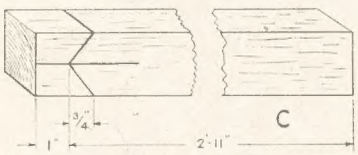


Fig. 3—Front section end shape

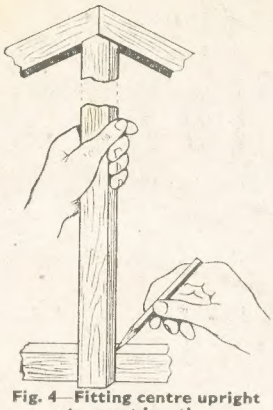


Fig. 4—Fitting centre upright to exact length

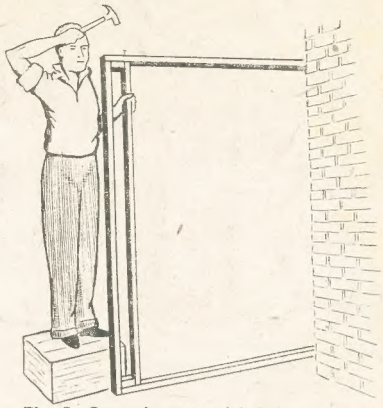


Fig. 5—Second stage with 3½in. spacing pieces being nailed in

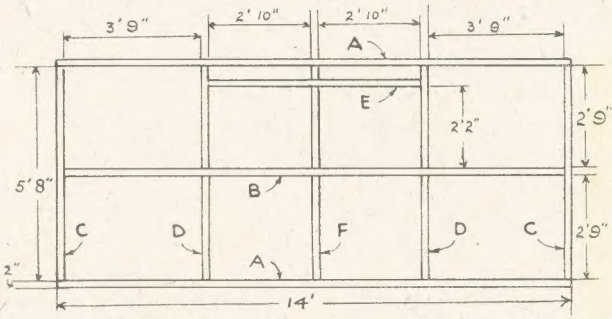


Fig. 7—Position of pieces forming side section

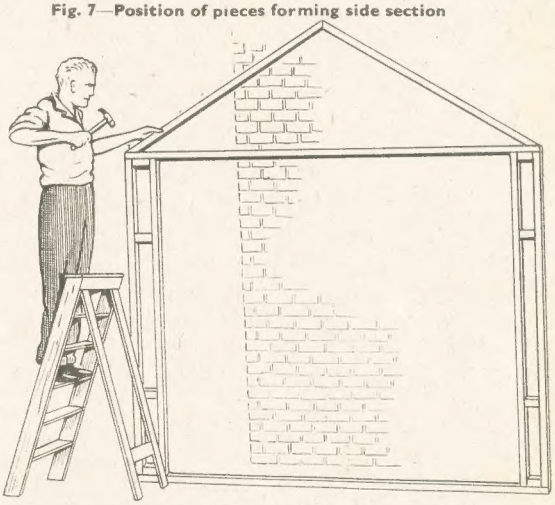


Fig. 6—Nailing in 4ft. 10in. angle pieces to front

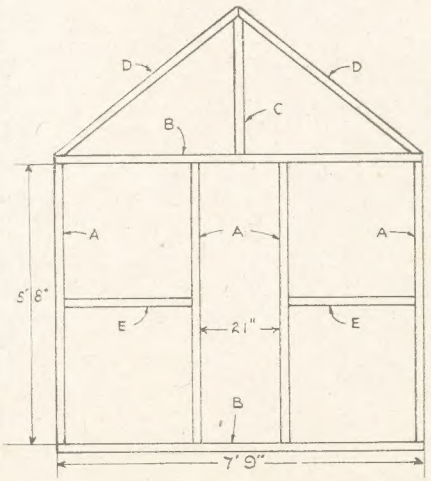


Fig. 9—Parts forming the rear frame

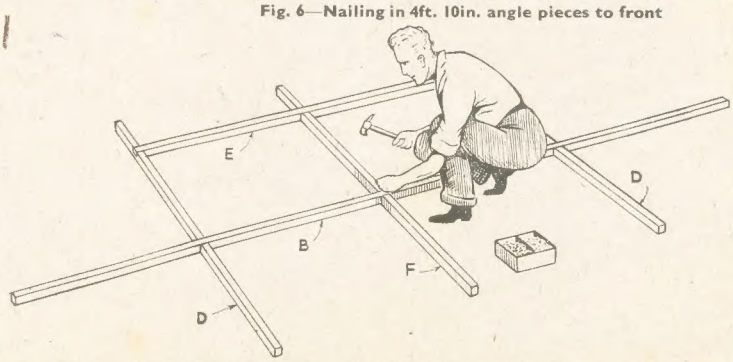


Fig. 8—The sub-assembly of the side section fixing

position while the inner (A) pieces are fixed.

Nail the eight 3½in. pieces in position. Drill the two pieces (D) to take 3in. nails, two at each end, and fit in position on the frame. Finally fit the centre piece (C). This should first be held in position and marked out as shown in Fig. 4. The front frame is now complete ready for the asbestos, the fitting of which is described later.

Making the Side Sections

The two side sections are identical. The position of the pieces are shown in Fig. 7. Half joints are used where the scantlings cross inside the frame. These are simple to make and need no explanation. Measure each piece very carefully, and cut to length. The five pieces (D) two off, (B), (E) and (F), should be marked out for the half joints, using a marking gauge and square. Finally cut the two 14ft. lengths to size and drill each end for the nails.

Prepare both side sections for assembling, then continue as follows. First nail the two 5ft. 8ins. (C) to the two 14ft. pieces to form a rectangular frame. Check this for being square against a sheet of asbestos. Now assemble the two pieces (D) and the piece (F) to the piece (E) and secure each half joint with one 2½in. nail, see Fig. 8. Place the 13ft. 8in. piece (B) in position and secure in a similar manner. Take up this sub-assembly and place it in the rectangular frame.

Before nailing in position, ensure that the ends of (B) come in the centre of the two uprights (C), and that the other pieces are parallel, also that the top of the two (D) pieces are touching the ends of (E). Nail the sub-assembly in position, using two 4in. nails at each end. Finally add a second 2½in. nail to the half joints, firmly clenching these over. The side sections are then ready for the asbestos.

Making the Rear Section

The position of the pieces forming the rear section are shown in Fig. 9. The two (D) pieces are identical to those on the front section and if the previous instructions have been followed they will be ready cut. The (C) piece is also the same and should be marked out and cut as shown in Fig. 4. Ensure that the other pieces are right for length and that the ends are square. The rear section is then ready for assembling.

Drill both ends of the two (B) pieces to take the nails, then nail them to the two (A) pieces to form a rectangular frame. Check this for being square, then mark the positions for the two (A) pieces on the top and bottom rails (B) to form the space for the rear door. Mark a line across the exact centre of the four uprights (A), and nail an (E) piece to each of the two inner (A) pieces, see Fig. 10.

Nail these into the rectangular frame as shown in Fig. 11, making sure that the door space is correct and parallel. Fit the two angle pieces (D) and the (C) piece in the same way as was done with the front section. The rear section is then ready for the asbestos.

The roof is divided into four sections, each section being made of 2ins. by 1½ins. scantling, as shown in Fig. 12. Half joints are used throughout these sections. Three 2in. nails are used at each corner and joint, these being clenched over. When the roof sections are completed, the entire framework is ready for covering.

The most popular sizes in asbestos are 6ft. by 4ft. and 6ft. by 3ft. With this in mind, the framework has been designed to meet these sizes. The necessity for cutting some of the sheets is unavoidable, but this need not offer any great difficulty if the instructions are carefully followed. The best tool for cutting the asbestos, is an old rip saw.

Although the expert can cut asbestos by nicking it with a file, this method is not to be recommended when the stock of asbestos is limited. Also it is possible to drive nails straight through the asbestos without first drilling, but this should not be done as there is always the danger of cracking the sheeting.

It is best to cover the side sections first, these being the most straightforward job. Lay a side frame on the floor and place in position two 6ft. by 4ft. sheets, one at each end of the frame. Position them to extend just half way across the two (D) pieces. Next, place in position a 6ft. by 3ft. piece with its upper edge extending half way across the middle rail.

With the three pieces in correct position, mark off and drill for the nails. Round the outside of the frame, the holes should be drilled 1in. from the edge of the asbestos, but where the sheets meet, and under the windows, the holes should be drilled ½in. from the edge.

(To be continued.)

TIMBER IN GROUPS

	Size	Length	No. of lengths
One side section (two groups required)			
Scantlings	2ins. by 2ins.	14ft.	3
Scantlings	2ins. by 2ins.	6ft.	6
Front section			
Scantlings	2ins. by 2ins.	8ft.	2
Scantlings	2ins. by 2ins.	6ft.	4
Scantlings	2ins. by 2ins.	5ft.	2
Scantlings	2ins. by 2ins.	3ft.	1
Rear section			
Scantlings	2ins. by 2ins.	8ft.	2
Scantlings	2ins. by 2ins.	6ft.	4
Scantlings	2ins. by 2ins.	5ft.	2
Scantlings	2ins. by 2ins.	3ft.	3
One roof section (four groups required)			
Scantlings	2ins. by 1½ins.	7ft.	2
Scantlings	2ins. by 1½ins.	5ft.	3
Roof supports			
Scantlings	2ins. by 2ins.	7ft.	3
Scantlings	2ins. by 2ins.	5ft.	4
Scantlings	3ins. by 2ins.	5ft.	2
One window frame (four groups required)			
Planed	2ins. by 1½ins.	3ft.	2
Planed	2ins. by 1½ins.	2ft. 6ins.	2
One front door (two groups required)			
Planed	4ins. by 1in.	6ft.	5
Matching	5ins. by ⅝in.	6ft.	8
Matching	5ins. by ⅝in.	6ft.	1
(One 6ft. length for the overlap)			
Rear door			
Planed	4ins. by 1in.	2ft.	3
Matching	5ins. by ⅝in.	6ft.	5
Weather boards and strips			
Planed	5ins. by ⅞in.	5ft. 6ins.	6
Planed	5ins. by ⅞in.	5ft.	2
Planed	4ins. by ⅞in.	13ft. 6ins.	2
Planed	2ins. by ⅝in.	8ft.	2
Planed	2ins. by ⅝in.	6ft.	24
Planed	2ins. by ⅝in.	3ft.	2
Planed	2ins. by ⅝in.	6ins.	2
Ornaments, planed	4ins. by 1in.	1ft. 6ins.	2

ASBESTOS

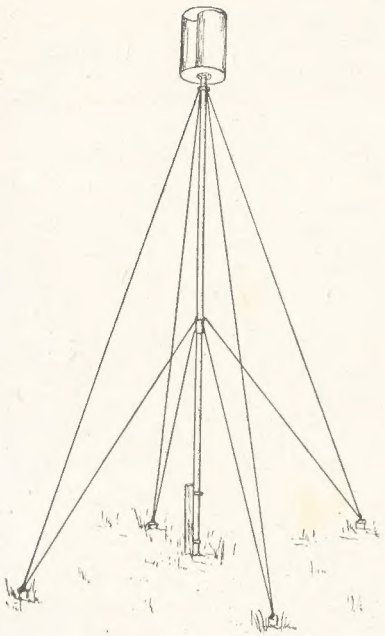
(All ⅛in. thick)

9 sheets at 6ft. by 4ft. *8 sheets at 6ft. by 3ft.*

SUNDRIES

6, 15in. 'T' hinges.
4 sheets of glass, cut to fit frames (approximately 2ft. 7ins. by 1ft. 11ins.
16 metal clips for roof.
28ft. of 3in. guttering.
10 gutter support brackets.
4lb. of paint. For doors, window frames, and weather boards.
Window fittings.
3 door bolts, one padlock and hasp.
2lbs. to 3lbs. of 4in. round nails. For 2in. by 2in. scantling.
1lb. of 3in. oval nails. For roof supports.
1lb. of 1½in. oval nails. For nailing on matchings.
2lbs. of galvanised nails (1½ins.). For nailing on asbestos.
36, 3in. screws. For 4in. by 1in. roof boards, and supports.
36, 1½in. screws. For fixing ledges.

A scientific principle of aero-dynamics in this NOVEL WINDMILL



WINDMILLS are always a source of great attraction, and so long as there is any wind left to drive them there will be many new designs appearing. Ever since windmills were first introduced into this country some 800 years ago, there have been an almost endless number of different types made.

The most popular kinds that we are so familiar with in the countryside have four large arms and were mostly used for grinding corn. In many other countries such as Holland and Scandinavia windmills of this kind are used to pump water for draining the land.

Arm Results

Experiments were carried out with mills having five and six arms, but were not very satisfactory and there was no gain in power as there must be a certain amount of space left between the arms for the wind to get away freely after doing its job. Indeed, one of the most satisfactory types in use today is simply a single aeroplane type propeller.

MODEL ENGINEER EXHIBITION

Readers in and around London should make a point of visiting the always-popular Model Engineer Exhibition to be held at the Horticultural Hall, Westminster from Aug. 9th to 19th. The very latest in model making practice will be on view, many of the stands demonstrating model making in a very wide range of subjects.

Besides being used for grinding corn and pumping water, windmills are very useful as a cheap motive power for quite a variety of purposes. One of the best uses is, undoubtedly, for driving a dynamo for the production of electricity for the workshop or home.

It is possible to make a very effective bird scarer worked from a small windmill and this should be a boon to the keen gardener.

The rather novel design of windmill described on this page, if built carefully is capable of doing some very useful work. The sizes given are for a small model, but these can be made much larger if needed to do the work of pumping water or generating electricity. A close-up of the head is seen in Fig. 1.

For an Open Space

There is nothing difficult about building this windmill and provided you have a nice open space in which to erect it, some very good results should be obtained.

The principal upon which it works can be seen by referring to Fig. 2. The windmill rotates on the axis (A), while (B) and (C) are two half cylinders. When the wind (shown by the arrow) blows into the cylinder (B) it causes the mechanism to rotate on the axis (A).

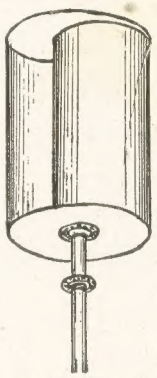


Fig. 1—The tin head

At the same time some of the wind is reflected off (B) and thrown against (C) which thus helps to increase the speed of rotation. The cylinder (C) acts as a streamlined surface until the windmill makes a half turn, when this is then in a position to receive the force of the wind and carry on the good work.

From a Cocoa Tin

The model described here is made from a one pound cocoa tin which is 3⅜ins. diameter and 6ins. high. This size need not be adhered to—any other size within reason can be used. It is suggested that the windmill should not be made any smaller, however, as even the size given is only for a model. If the windmill is required to do a useful job of work it must be made considerably larger.

Cut off the bottom of the tin and also cut down either side of the seam—a pair of metal shears or an old pair of scissors will do this. The rough edges should be filed smooth and during this operation be careful not to alter the curves of the two half circles. By saving the lid this can be used as a template.

Two circular pieces of tin are used to keep the half circles in position. Reference to Fig. 2 will show that these plates are 5½ins. diameter and they can be made from old tins flattened out. By means of the lid template carefully mark out the positions for the half circle vanes.

Ball Bearing

Before proceeding further with the fixing of the vanes, the bottom plate must be fitted to some sort of mechanism to enable it to revolve freely. There are many ways in which this may be done but probably the easiest as well as being the best, is a ball bearing hub from an old cycle. Drill a hole in the centre of the plate large enough to take the nut and screw end of the hub and also 3 or 4 small holes corresponding with the spoke holes. Small nuts and bolts will then securely fix the plate to the hub, but make quite sure that the nuts are tight. A hub is shown in Fig. 3.

We are now ready to fix the wind vanes on to the end plates. Place the half circles carefully on the lines already marked on the end plates and run plenty of solder in to make a wind tight join.

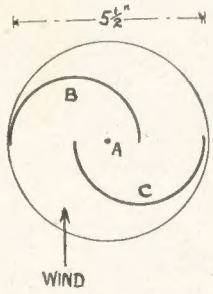


Fig. 2—Principle of rotation

Fig. 3—Ball bearing hub

There is no need to mention the fact that a windmill should be erected as high as it is possible to get it in order to catch the full force of the wind. It must be left to your discretion to fix your mill in the best position. On the bottom end of the cycle hub is a good thread which can be screwed into a length of gas pipe or fastened on to a piece of angle iron.

If the windmill is going up fairly high be sure to have sufficient guy wires, especially if you have made a larger model. Before the final erecting, it would be advisable to give all metalwork a coat or two of protective paint.

It would be a good idea to make a small size model first to find out exactly how it works, and then if you decide to build one to supply electricity or to pump water, you can design a much larger mechanism. (167)

For the armchair smoker you should make this

ASH TRAY HOLDER

THE stand ash tray holder illustrated is the sort of simple piece of woodwork which the average handyman at home can undertake for his own comfort, or as a gift to a man who is a smoker. The actual article need not be followed exactly for style, but it certainly offers a suggestion for other readers who may have any particular bits and pieces to choose from and to build into their own particular style.

The main thing is that the height should be convenient to anyone sitting in a low easy chair, and the length of the main pillar, therefore, really rules the overall height. The one shown here was cut from an odd tapering table leg, whilst the circular curved base and the inverted holder at the top were two odd parts of bedside table lamps which had found their way into the junk box.

The Column

The column between them could, of course, be of other shape than the tapered square shown. You may have one of the Jacobean candlesticks sufficiently long to provide the column you want, or you may have a piece of curved chair leg or similar article which may serve the purpose.

If possible, all the material should be the same character, and oak will be preferable as being more solid-looking and dignified in use. On the other hand, there is no need to throw up the job because the timber is not all alike, because you can stain it very dark, or even paint it a bright colourful hue.

The other point you have to note before commencing is of the ash tray to be used in conjunction with it. This should not stand loosely on the top platform, but should be made to fit into it to prevent sliding off and yet to be removable when the ashes have to be emptied. The actual base should be large enough to form a wide surface and even so, it is as well to introduce a weight of some kind to maintain an upright position when in use.

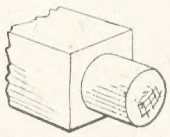


Fig. 1—Pillar top and bottom dowel joint

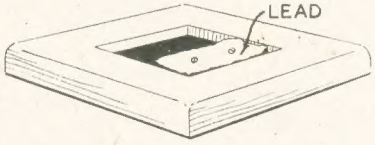


Fig. 2—The base recess with weight

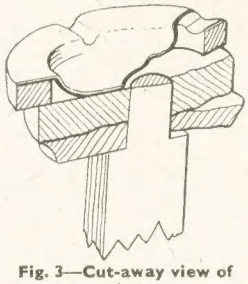


Fig. 3—Cut-away view of top

Alternative Shapes

If we give some details of the actual one shown, the measurements will serve as a useful guide, although as previously mentioned, they need not be followed exactly. You may prefer to have an all-circular base, for instance, or the part you have in mind and available may even be octagonal or hexagonal. There is no objection to this, but, of course, the upper base should be roughly in proportion and in keeping with the lower one.

Now for the general details. The tapered centre column is 16ins. high with the overall height 20ins. Check this up for your own requirements to see it is useful for your own chair. The lower base is a plain piece of $\frac{3}{4}$in. oak $6\frac{1}{4}$ins. square, and the turned base on the top of it is a 5in. diameter circle of wood which formerly provided a table lamp base.

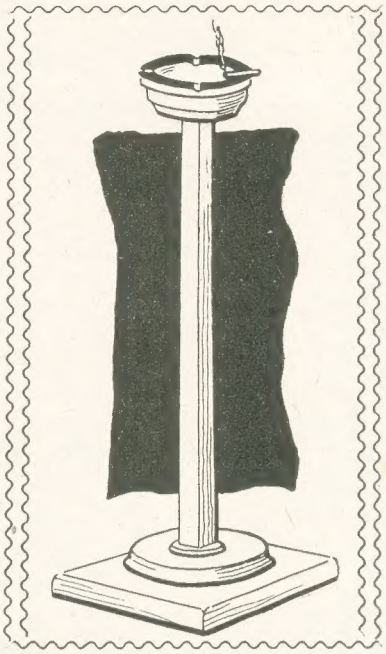
A Wheel Base

If you are unable to obtain this, then possibly a turned wooden wheel such as used on toys could be brought into use. The central hole will serve to take a stop spindle cut on the end of the central pillar.

The tapered pillar shown is $\frac{1}{4}$in. square at its bottom end, and the projecting spindle piece top and bottom should be $\frac{3}{4}$in. long to provide strength. If your circular base is not as thick as this, then the spindle portion should be less, but it should certainly pass through that part. This spindle portion should be left fairly large in diameter, as seen at Fig. 1, with the square bottom of the pillar providing the shoulder. Get a tight fit and ensure that the pillar stands upright.

The base in itself is not sufficiently heavy, so that a weight of some kind must be introduced. In the one shown, a flat slot was cut large enough to accommodate some odd slabs of lead, one of which is shown in place in Fig. 2. These odd pieces of lead can be obtained from a builder's yard or ironmonger for a few pence, and should be made to fit quite tightly into the aperture, or can be screwed down. It must, of course, be flush with the top of the wood so that when the circular base is fitted on, the two parts get snugly together.

Stain each piece separately, then glue on the circular one after marking its position in pencil. To prevent any likelihood of warping, a couple of screws can be added on the inside with their heads countersunk so as not to scrape any surface. The column can now be glued in, being made rigid, firm and upright.



Having obtained the particular ash tray to be used, you will then have to work out the method of holding it in place. A shaped circular top should, in any case, be added to the top of the column, and here again, the wooden toy wheel or the vase of an electric bedside lamp can be used. If a base is incorporated, it should be inverted to have the larger surface uppermost. Then a circular rim of thinner wood can be added to provide a recess for the actual tray.

Metal Ash Tray

If it is one of the normal ones with indentations for cigarettes, the rim will have to be cut or grooved to allow this sinking. It will also help to hold the end in place. The rim holding the tray in place need only be $\frac{1}{4}$in. or $\frac{3}{8}$in. in thickness, but should project beyond the under circle of wood also by $\frac{1}{4}$in. or $\frac{3}{8}$in.

The centre of this top tray rest should, of course, accommodate also the rounded spindle of the top of the pillar in the same way as shown in Fig. 1 for the bottom. If there is not a hole already bored in the main part, then you may either take one out with a brace and bit, or leave it as a square opening for a normal mortised and tenon joint.

Take some care in measuring out this top portion, and that its rims ensure the ash tray lying snugly into its bed. Finally glue the parts together rigidly and clean them thoroughly with glass-paper.

The completed stand is afterwards stained according to taste, or if a variety of wood has been used, it can be coloured with enamel after a first priming coat has been added.

History, Geography, Humour can be found in

COLLECTING INN NAMES

THE great increase in road travel during the past few years has given us another 'collecting' hobby—names of inns and taverns. Enthusiasts do not merely collect the names, but delve into the meaning and origin of the various signs they encounter.

At first sight, the names and designs of many pictorial signs seem ridiculous to a degree, but a little investigation very often brings to light some extremely interesting explanations.

At the sign of 'The Five Alls'

The inn sign is a relic of the days when the majority of people were unable to read and the trader had to resort to various signs and symbols to call attention to the nature of his business. The gaudily painted striped pole for example, still to be seen outside barbers' establishments, originally informed the illiterate that the proprietor was a surgeon as well as a barber—the stripes on the pole representing a bandaged limb.

The origin of many signs, of course, is readily understood. The *Lord Nelson*, *Palmerston*, *Duke of Wellington*, for instance, were obviously inspired by events and personalities of the day. The various types of 'Arms' are also easy to trace, and refer to the armorial bearings of the local ground landlords. The two interesting pictures are loaned by Bristol Brewery Georges' and Co.

Unknown Origins

A great many signs, however, have meanings far from obvious. Why *Goat and Compasses*? This is a fairly common sign and one with several variations such as *Three Compasses*, *Goat's Head*, and so on. They refer to the arms of the Ancient Company of Carpenters and the Company of Cordwainers (shoe-makers). It is thought that landlords of early times hoped they would flatter workers in these trades and so encourage their custom by featuring the Arms!

The Arms of many other City Companies have been 'adopted' in similar fashion. *Adam and Eve* illustrates the Arms of the Fruiterers' Company, *Elephant and Castle* the crest of the Cutlers' Company. The various versions of *The Ram* were most probably inspired by the Arms of the Clothworkers' and Drapers' Companies, whilst the *Three Tuns* portray the Arms of the Ancient Company of Vintners.

The *Green Man* is a sign common in parts of the country, but many innkeepers in the past have caused the sign to be erroneously painted. Actually, the symbol of a Green Man is of great antiquity and found among the armorials of old families. With the passing of centuries many liberties have been taken with the genuine symbol and thus the *Green Man* may depict Robin Hood or old-time gamekeepers!

Commemorating Disputes

Near Tetbury, in Gloucester, you may chance upon an inn with a strange name indeed—*Trouble House*. It refers to the fact that the inn was the scene of angry disputes by local landworkers over the introduction of agricultural machinery and many heated debates took place within its walls.

That the sign of *The Bell* is so numerous is due to the fact that a bell was the coveted trophy presented at York races in the early seventeenth century. Nevertheless, some inns of this name existed long before this, for Chaucer (14th century) makes mention of a *Bell Inn* at Southwark. Some inn sign experts express the view that the title was devised as a subtle invitation to win the patronage of early bellringers!

The *Flower Pot* is fairly common in some parts and is believed to have been derived from the lily vase shown beside the Angel Gabriel in medieval pictures of the Salutation of the Blessed Virgin.

The Hole in the Wall is a sign which puzzles many people. The general belief is that it refers to the hole in the wall of old-time debtors' prisons, through which friends of an imprisoned person could pass into the cell food and other comforts.

Almost every country has its quota of *White Harts*. This symbol is of classic origin and has been popular as far back as the days of Alexander the Great, who died in the year 323 B.C. The *White Hart* at Southwark was said by Shakespeare to be the headquarters of the notorious Jack Cade (A.D. 1450).

A striking topical sign

The numerous *Lions*, *Bulls*, *Feathers*, *Griffins*, etc., mostly have their origins in heraldry, and many are combinations and adaptations. The *Crooked Billet* is often a puzzling sign. The word 'billet' means a log of wood. This symbol was used by the proprietors of early alehouses for they hung a log of wood over their doors to indicate the nature of their business.

Cross Keys is a very well-known sign and represents the emblem of St. Peter. Keys are incorporated in many ecclesiastical arms including those of the sees of Ripon, Gloucester and Exeter, so it is easy to understand the wide use of this symbol. *The Case is Altered* (of which there seems to be only three examples) is a real poser. At least one of the three examples shows a rider on horseback and the sign refers to a mounted messenger who brought to London news of a favourable change in our fortunes during the Battle of Waterloo.

Modern Examples

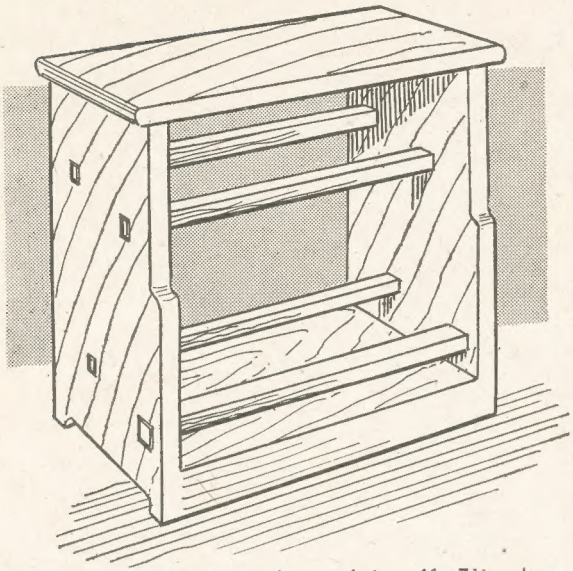
By way of contrast to these signs of ancient origin we occasionally find some modern examples. For instance, there is at least one *Gasometer* (in Northamptonshire), a *Come Inn*, a *Welcome Inn* and a *Listening Inn*. There is one at Hastings which commemorates the hectic days of the G.I.

Ancient inns and their curious signs make a very interesting study for it brings to light events in history, old customs, and old trades. Unfortunately, many of our oldest inn sign boards, often works of art, have passed into the hands of private collectors, particularly Americans.

On the other hand, the brewing companies of today are showing great interest in the topic and many ancient signs have been most carefully copied or restored by first-class artists. (180)

If you want a sensible piece of carpentry build

A SHOE STAND



TO keep spare shoes tidy a rack is very necessary. A substantial design of rack is illustrated, capable of accommodating 2 pairs of men's shoes, and 3 pairs of ladies'. Where additional accommodation is needed, the length of the rack can be increased proportionately for the purpose.

Wood $\frac{5}{8}$in. thick is suggested for making, and if shelving board can be obtained, which is usually of that thickness, and up to 11ins. wide, the ends of the rack can be cut in one piece and no gluing together becomes necessary. Thicker wood can be used, but the result tends to look rather too heavy and clumsy.

The two ends of the rack can be set out from the drawing in Fig. 1. The mortises for the rails which support the shoes, are $\frac{1}{2}$in. wide, except the bottom right-hand one, which is 1in. These can be chiselled out in the usual way, but some saving of time is effected if the majority of the wood is removed with a $\frac{1}{2}$in. centre bit, leaving only the corners for the chisel to cut. Leave clean cut edges to the mortises for a general neat effect. At the bottom, cut away a 1in. wide strip for most of the width, to lighten the appearance.

A front view of the rack is shown at Fig. 2, the shoe rails being broken across to show their separate position in the rack. Cut these rails from the $\frac{5}{8}$in. board, three of them being 1in. across, and the bottom front one, 2ins. across. Cut them 1ft. 7$\frac{1}{2}$ins. long, and cut away the ends for a distance of $\frac{3}{4}$in., as shown at (A) in Fig. 3, to leave $\frac{1}{2}$in. tenons to fit the mortises except the broader bottom rail, which is trimmed to leave 1in. tenons.

Floor Rails

Two additional floor rails are required, 1$\frac{1}{2}$ins. wide and the full interior length of rack, i.e. 1ft. 6ins. These are to be nailed across at the bottom, one at the front and the other at the back. Their position is shown shaded in Fig. 1.

The top of the rack is cut to overhang sides and front by $\frac{1}{2}$in., and is grooved $\frac{1}{8}$in. deep underneath to receive the ends, as at (C). Owing to the frontal overlap, obviously these grooves must be stopped $\frac{1}{2}$in. from the front edge. The making of a stopped groove is sometimes considered by the amateur as a touchy job. Actually, if performed in the right way, it is quite easy.

Mark the grooves out, then with a mallet and chisel, cut away a recess about 1in. long and as deep as the proposed groove, at the stopped end. The tip of the saw can then enter this recess and the cutting of the groove proceed in the usual manner, with, perhaps, just a trifle more care.

Assembly

To fit the parts together, glue the rails to the ends, glue and nail the floor rails across and then fit the top on. The edges of the top should be slightly rounded off where they overhang the rack. A bottom of plywood or substitute board is glued across the floor rails, as at (B). A few small thin nails should be added here.

Finally, in the corner angles at the back of the rack, glue and screw stiffening blocks, as seen in the front view, Fig. 2, to brace up the structure.

The projecting ends of the rail tenons should be bevelled off, and then from looking rather unsightly, they will present a pleasing finish to the flat sides. The woodwork should be nicely cleaned over with glasspaper.

TIMBER LIST

Sides (2)—$\frac{5}{8}$in. by 11ins. by 1ft. 6 ins.
Top—$\frac{5}{8}$in. by 10$\frac{1}{2}$ins. by 1ft. 8$\frac{1}{2}$ins.
Shoe rails (3)—$\frac{5}{8}$in. by 1in. by 1ft. 7$\frac{1}{2}$ins.
Shoe rails (1)—$\frac{5}{8}$in. by 2ins. by 1ft. 7$\frac{1}{2}$ins.
Floor rails (2)—$\frac{5}{8}$in. by 1$\frac{1}{2}$ins. by 1ft. 6ins.
Plywood or substitute—11ins. by 1ft. 6ins.

Finish

So far as a finish is concerned, if the rack is intended for bedroom use, it could be stained oak colour and varnished, or enamelled in any pleasing colour. For kitchen or scullery it could well be left plain, or be just varnished.

As shoes are usually cleaned and brushed in either kitchen or scullery, a useful addition to the rack can be added, if thought worth while. This is a box arrangement, as sketched in Fig. 4, for the accommodation of brushes and polish. If it is determined to add this, one of the ends of the rack is made 4ins. higher than the other, and the top is grooved into this end, as seen in the sketch.

At a distance of about 8ins. from this extended end piece, which, of course, forms one end of the box, a second end

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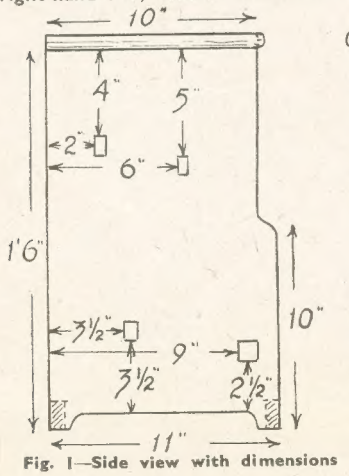


Fig. 1—Side view with dimensions

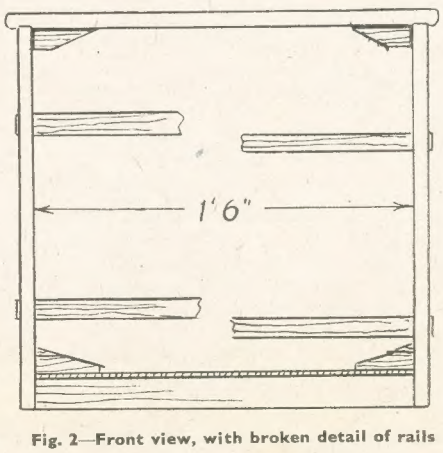


Fig. 2—Front view, with broken detail of rails

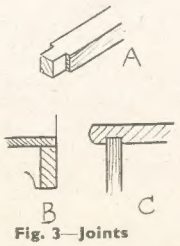


Fig. 3—Joints

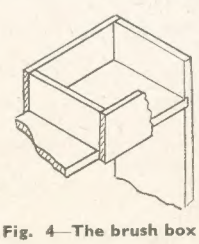


Fig. 4—The brush box

An excellent gift for a man is this novelty

PARROT TIE RACK

THE tie rack indicated in Fig. 1, of the accompanying illustrations, is just the thing to make for a present, or you may feel inclined to make one for your own private use. The novelty of the rack may be said to rest with the parrot, and details are given in Fig. 2.

Commence on the parrot by selecting a piece of sound wood, size 9½ins. long by 5½ins. wide and ⅜in. thick. Divide the wood into ½in. squares and then copy the outline of the parrot. Drill two holes ⅜in. diameter to allow for the dowel rods to pass through, one hole being in the beak 1 5/16ins. from the top and ¾in. from the side, and the other through the foot 2 15/16ins. from the centre of the top hole, and 2¾ins. from the side, Fig. 2.

These holes should be accurately made in order to avoid trouble in fitting later on. Carefully cut the tenon 1in. long and ½in. wide on the back of the parrot, as shown, then neatly cut the figure to shape.

In order to do the colouring of the parrot with ease, it is best done before it is fitted together. A nice effect is obtained by marking the lines shown in Fig. 2, with black enamel, then filling in the spaces with coloured enamel, as indicated. Each side of the parrot is coloured, and the edges are coloured to correspond with the colour on the sides.

Two end supports are required for the rack and details are given in Fig. 3. Cut the wood 5½ins. by 5½ins. and ⅜in. thick and divide into ½in. squares. On a centre line 1 5/16ins. from the top and ¾in. from the side, scribe a circle ⅜in. diameter for the dowel rod. With the same centre, scribe a circle ¾in. radius as in Fig. 3. Carefully measure 2 15/16ins. from the centre and a distance 2¾ins. from the side, which will give the centre for the lower dowel rod.

On this centre scribe a circle ⅜in. diameter and also the arc ¾in. radius, as indicated. Now draw the remaining outline of the brackets from details given, and cut the tenon 1in. long by ½in. deep in the position given. Carefully drill the holes for the rods, then neatly cut out the shape of the brackets.

The base for the rack is indicated in Fig. 4, and this is made in wood ½in. thick. First cut the wood 12ins. long and 3½ins. wide. On a centre line through the wood, mark off and carefully cut the three mortise slots 1in. long and ⅜in. wide. The two outer slots are cut in positions ½in. from the end as clearly shown. Take care when cutting the slots and make them a good fit on the tenons of the parrot and brackets.

Mark off two points a distance of 3ins. from the ends and ⅞in. from the top, and bottom edges, as shown, and drill holes at these points to take a No. 10 or No. 8 wood screw for fixing. From a distance of ¾in. on each side of the centre, taper the top and bottom edges of the base down to 2ins. wide at the ends as clearly shown in Fig. 4.

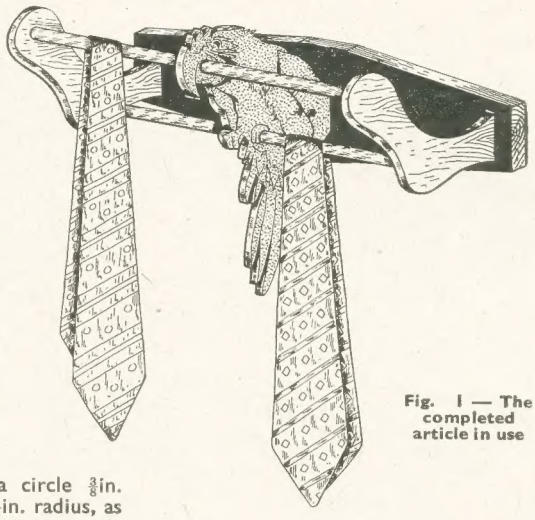


Fig. 1 — The completed article in use

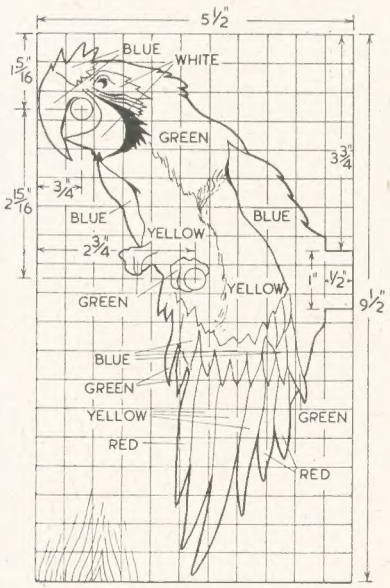


Fig. 2—Outline of figure with suggested colours

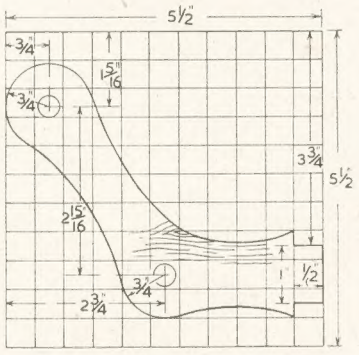


Fig. 3—Details of the end supports

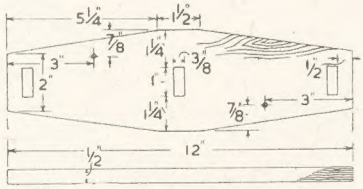


Fig. 4—Shape and mortises in back rail

Dowel Racks

Two pieces of ⅜in. dowel rod are required 11ins. long, and the items may then be fixed together. First see that the dowel rods are a loose fit in the holes made in the parrot. Slide the rods through the holes in the parrot, prepare the ends with glue and fix the brackets. Glue the tenons on the parrot and brackets, then fix into the base. The rack is neatly finished by giving the rods, brackets and base a coat of stain, and the article is ready for fixing in any desired position.

Shoe Stand—(*Continued from page* 231)

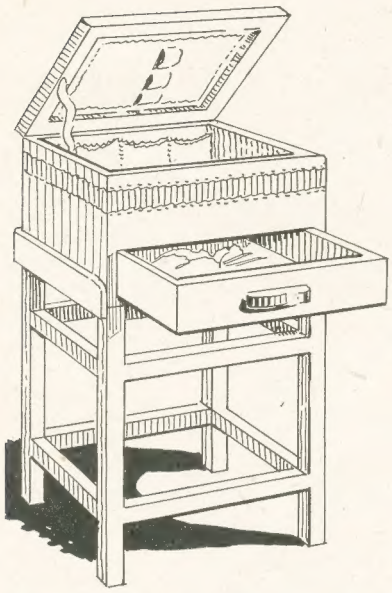
piece is nailed across, and the open sides covered in with pieces of slightly thinner wood to complete the box.

It is necessary to remember here that as ⅛in. of the short end is in the groove of the top, the height of this end must be increased accordingly. In other words, make the height 1ft. 6⅛ins., then no miscalculation will ensue. Complete the box addition with a lid, which can be hinged or just a 'lift off' one. A centre divisional piece might be added to keep black and brown brushes and polish separate. Many readers know, with painful recollection, what happens when brown shoes are accidentally polished with a brush previously devoted to the black ones.

Just one point to add. If the box addition is decided on, do not forget to reduce the width of the top just ½in. (the amount of the frontal overhang) for that part forming the base of the box. This will, of course, be apparent when making it up, but it is as well to mention it now in case it should be overlooked until gluing up starts.

Provide your wife or friend with this practical

LADY'S WORKSTAND



THE modern-style needlework box, shown in the illustration, is strongly constructed of wood and covered with a good plain fabric or paper. The interior of the box should be lined with moire or silk, fitted with pockets at the back for silks, etc., and with loops on the underside of lid for scissors, needles, etc.

There is also a large drawer for reels of silks, thread and other smallish materials. The box must be strongly put together, as this type of box generally comes in for a fair amount of rough usage.

General Dimensions

The size of the box overall is 12¼ins. by 10¼ins. wide and 5¾ins. deep. Wood ¼in. thick is used throughout and the lock joint used at all corners, as shown in Fig. 1. If the worker should, on the other hand, decide to adopt the plain butt joint and nails, then he must strengthen the whole construction by gluing in the angles of the box and elsewhere, some angle fillets either quarter round or plain triangular angle fillet.

To make a satisfactory job of the lock joint suggested, needs careful measuring off and marking out. Take, for instance, the joint between the back of the box (B) and the two sides (A). With a 12in. rule laid across the boards, mark off the seven divisions ¾in. wide. Then set in a margin of ¼in. The fretsaw will do the rest, care being taken to keep on the outside of the drawn lines when cutting.

The jointing up of the tongues will then fit stiffly together. See they go together accurately, then take apart and brush the glue at all meeting surfaces. In marking out the joints between the side rails (A) and the front rail (C), divide the 3½ins. width into six with a pair of compasses or dividers. Brush all the joints with the glue and knock the frame together, testing the angles inside afterwards with a set square.

The Floor

Now cut the floor (D) 12ins. by 10ins. and glue this to the frame, putting in a few fret pins to hold the piece flat while the glue is hardening. The upper floor (D1) is now added. This measures 11½ins. by 9½ins., dropped in to a depth of 3¼ins. from the top of the frame, as seen in Fig. 1. One or two flat screws or

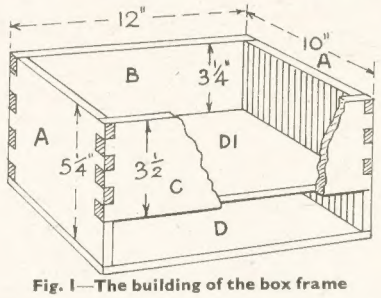


Fig. 1—The building of the box frame

a few fret pins may be driven through into the floor for further strength.

The Drawer

The drawer is simple in construction, as Fig. 2 shows. There is a shallow frame made from four rails 1½ins. wide, the two side rails (F) measuring 9ins. long and two rails (E) 11½ins. long. All are lock-jointed at the angles, see Fig. 2. A floor piece will be glued to the frame, and the edges round afterwards glass-papered and made to fit neatly into its opening in the box. To the front rail (E) of the drawer is fixed an outer front (G), measuring 12ins. by 2ins. by ¼in.

In fixing on the front (G) see that its lowermost edge comes flush with the lower edge of the floor. The dotted line shows this in the large circled diagram in Fig. 2.

It remains to cover the box with the fabric as suggested. The first operation will be to first cover the whole box outside with a good stout brown paper.

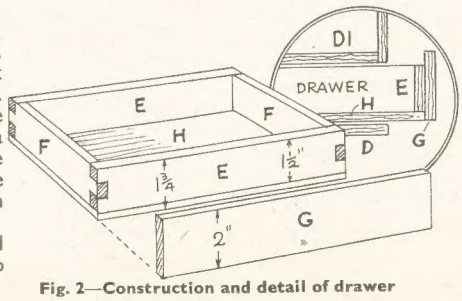


Fig. 2—Construction and detail of drawer

First glue some strips all round the top edge of the box wide enough to lap down ⅛in. or so on the inside and the outside. Cover all four sides of the box with the paper, and when the glue has hardened, cut the paper neatly round the drawer opening with an old safety razor blade.

Coverings

The inside of the box, including the floor, should be covered with white paper or drawing cartridge paper. Bring up the inside paper to within about ⅛in. of the top edge of the box. Now mark out and cut the covering fabric, allowing it to lap over the top ¼in. and round on to the floor of the box about ½in.

Coat the outer sides of the box with thin hot glue and gently press the fabric in place on to it. Take care to preserve the pattern of the fabric if there is one, during this process. Trim round the opening of the drawer again and see that the extreme edges of the material are well glued down in place.

Cover the front of the drawer with the fabric. The inside may be either stained with a suitable wood stain or else lined with white or coloured paper. The material used for lining the inside of the box should be of some contrasting colour to that on the outside. It is put in in a similar manner to the outside covering.

The wood for the lid measures 12¼ins. by 10¼ins., and to stiffen the piece, an inner frame of 1in. or ¾in. wide wood ¼in. thick may be added flush with the edge all round. Cover the lid with the paper and fabric in a similar way to the box and then hinge the lid with a pair of 1in. stout brass hinges. Cover the inside of the lid with silk to match the interior of the box and then

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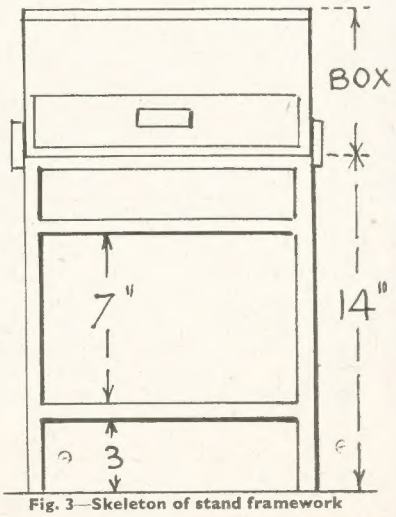


Fig. 3—Skeleton of stand framework

How the handyman can service noisy water

TANKS AND CISTERNS

IF you happen to live in a house with some kind of cistern in or near one of the upper rooms you may have often been exasperated late at night by the time the cistern takes to growl to quietness after the last person has drawn off hot water for a late bath or wash. Worse still is a steady drip, drip through the night. Once in a while the noise may drive you almost to madness or set you thinking of 'Bloop Bleep'.

Perhaps you think that the best cure for the drip is to turn off the water at the main, get at the tank, withdraw the split pin on the ball arm, extract the cylinder containing the india rubber washer, replace the washer and repeat the stages of the job in reverse, ending by turning on the water again.

A Cure for Drip

In nine times out of ten this is all that is required, but occasionally there are other difficulties. If the washer does not protrude enough it may not be pushed hard enough against the water pipe to stop the flow completely, even when the ball floats up. The cure is to put a tiny packing of cotton wool or yarn behind the washer to make it bulge a little more, as shown in Fig. 1.

In times past somebody may have thrust something like a screwdriver along the cylinder socket to the point to which the washer presses. In this case the brass may have been scored, leaving a tiny channel for a perpetual drip, even after a new washer has just been fitted.

One cure is to unscrew the pipe and fitting, and with a small triangular file gently file the water pipe opening until the scoring has been ground away—a job which will take, perhaps, 20 minutes. It should, however, seldom be necessary to take such drastic action. The necessity for it can be determined by putting the little finger up to the washer seating and scratching about with the fingernail to feel for any irregularity.

The Cause

Having done one or other of the jobs mentioned you may still be maddened to find a tank drip steadily and wilfully during the night. This may be because it is the cold supply tank for a hot water tank heated by a domestic fire which goes out each night. During the night the water of the hot tank grows smaller —contracts—as it cools, and this is equivalent to leaving a tap on the hot cistern dripping slowly.

Reducing Noise

The obedient cold tank, therefore, itself starts to admit drips to the cold tank to keep up the level. This distressing malady might seem incurable at first thought, but there are actually two ways of tackling the trouble.

The first method will help deaden other than drip noises. It is quite simple and applies to all uncovered tanks with ball valves. Place a flat sheet of thick cardboard over the top of the tank, cutting small slots to fit the sheet round any pipes which may run into the top of it. The reduction of noise in an open cistern in an upstairs cupboard is astonishing. Somehow the noise of running water builds up or resonates more in the whole cupboard, but when the bulk of the sound is reflected inside the tank by the cardboard, the noise is much reduced.

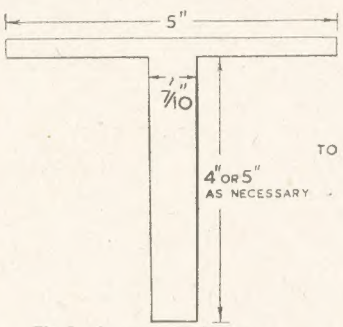


Fig. 2—A metal 'T' fitting

Noise Reduction

A general reduction of noise may relieve the house of hot tank noises it has been enduring patiently, perhaps, for years. But may still leave the faint insidious sound of a drip to become loud and annoying during the night.

For an Emergency

The noise is caused by the fall of water drops from the valve 2 or 3ins. to the surface of the tank. If these drips can be caught on something and allowed to run down into the water, the drip noise is cured.

An emergency method—not to be recommended—is to tie a bit of string or thin cloth in such a manner that the drips are caught and run down. But the danger of such a scheme is that movement of the anti-drip material may foul the cistern arm, or on rotting away after a year or two, get into the pipes.

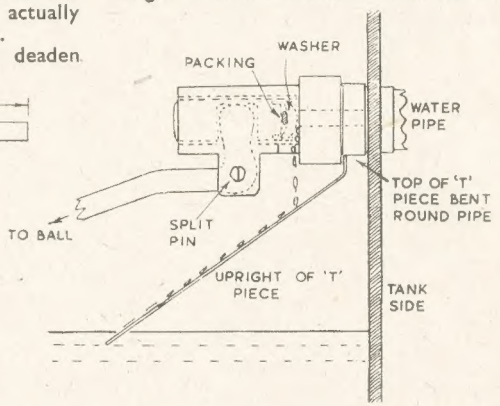


Fig. 1—Packing a washer to prevent drip

A 'T' Piece

The best method is to make out of copper or brass sheet a 'T' piece of metal of dimensions approximately as shown in Fig. 2. The top of the 'T' should be bent round on the neck of the fitting and can be wired in place or even soldered if the fitting is dismantled.

The T upright under the fitting is bent to slant down into the water, as shown in the diagram, and catches the drips when they have fallen, perhaps, ½in. This sound cannot be heard. Test the device to see it does not cause splashing when the valve is well open. This, and a cover should reduce the most boisterous tank to abashed murmurs. (193)

Work Stand—(*Continued from page* 233)

add the loops and small pockets as suggested.

A simple handle should be added to the drawer of thick wood cut to shape with the fretsaw and screwed in from inside. The handle should be painted or varnished. The bottom of the box should have a piece of baize glued on to within an ⅛in. of the outer edge all round.

It is optional, of course, whether the box should have a stand, but if used in the garden or on the lawn, the addition would certainly be well worth the time and trouble of making. In Fig. 3 a skeleton diagram only of the stand is given with suggested sizes. With regard to the material for it, ⅝in. or ¾in. square stuff is very suitable.

There are two or three methods of jointing the pieces together, the rails may be tenoned into the legs, this makes a good strong job, or the rails could be dowelled into the legs. The cross rails being arranged, as shown in the diagram, hold the legs well together and should make the stand perfectly rigid.

The top of the stand is framed between the legs and here brass angle plates may be introduced to stiffen up the fastening and joints. Around three sides of the top are upright rails 1in., Fig. 3, about 2ins. wide and of ¼in. stuff. These must project above the table top so the work box will slide in and be firmly held. The whole thing may be painted up in colours to suit the work box.

Some worth-while hints if you undertake

PAINTING MODEL LOCOS

IT is queer how the painting, lining and lettering of a loco body presents a mentally insuperable difficulty to many really skilled model engineers, even though they may have produced many excellent examples of engine body-building work. Most of these inherent fears are generally without foundation, and it would be true to say with that great statesman, the late President Roosevelt, that the 'only thing we have to fear is—fear'. It is a question of taking ones' courage 'in both hands', and making a start. But—a right start must be made.

Scribed Lines

Few model railway engineers realise that a good 'professional' paint finish has its genesis in the earliest processes of actual construction—viz. the lines scribed on to the metal sheet before even the parts are cut out.

These lines are too often scribed so deeply that all question of their subsequent eradication becomes impossible, and they thus remain to show through as many coats of paint as one cares to lavish on the finished model. The moral is obvious—be as light-handed with the scriber as possible, only producing as deep a line as is absolutely needed for legibility.

Solder Joints

Another point which is frequently missed is that which can give a lot of trouble at the painting stage—that of poor and inefficient soldering. By ensuring that all constructional joints are sharp and clean, and that no 'dry' or 'blobbed' ones are allowed to remain on the completely-constructed bodywork, unsightly dimples and bumps—which no amount of filler or undercoating will eradicate or conceal—will be entirely eliminated. Paint will 'cover a multitude of sins', but it will not remove them! Truly, a perfect model loco paint finish starts in the metal-working stages.

It may not be known generally that paint does not 'key' on to brass very well, particularly if the metal has been highly polished. Many a good model—brightly polished for exhibition competition purposes—has been completely marred by its builder attempting to paint it in the polished state without any previous treatment.

Dull Surface

It is often forgotten that the metal-polish which has been used to produce the bright finish contains paraffin oil, and that the perfectly even shiny surface must first be dulled—i.e. scratched with minute lines—before any attempt is made to paint it.

This dulling may be carried out either with 'blue-back' dipped in water, or by dipping a piece of silk in a mixture of 'FFFF' emery powder and water. (Emery abrasive finer than that which passes through a sieve with a mesh of 200 to the linear inch being sometimes sold under the name of 'flour' emery).

Leave the Tarnish

If the body has never been polished brightly, and appears tarnished, it is a good plan to allow the tarnish to remain, as this will give a proper anchorage to the first paint coat, and a tough shock-resistant surface will be produced.

After the surface of the metal has been suitably roughened, and all the inequalities of the surface have been removed, the next process is that of chemically washing the body till absolutely all traces of grease and oil have been removed. It is not enough merely to dust down with a small brush (some people using the same brush as that used for painting for the purpose!) which simply moves the oil and dust from one part of the model to another.

The body must be literally washed in a liquid which will solve grease and oil, and in this respect the reader would be well advised not to use petrol (of any colour!) for the purpose; as this fluid—even 'lighter fuel'—is far from pure. The best thing to use is benzine, which is obtainable at the chemist's, and can be said to be as free from oil as one could possibly wish.

Gas Warning

Ethylene Dichloride and Carbon Tetrachloride ('Thawpit') are both quite good, but the former has a nasty quality of forming the poisonous phosgene gas when mixed with tobacco smoke. So if used, it should be manipulated out of doors in a breeze—and No Smoking! Benzine is, of course, highly inflammable, so due care is necessary to avoid any accidents.

There are professional model-makers who insist on the superiority of caustic soda for grease-removal, but in the writer's opinion, its use is both dangerous and unnecessary unless old paint of a very obstinate nature is being removed, and it is possible to completely immerse the whole loco body in a covered bucketful of caustic for 24 hours.

It is a dangerous substance—all the more so because it looks so innocuous and innocent, neither fuming nor smelling in any way—and rubber gloves should be worn during all handling operations. Any splashes on the clothes should be immediately liberally treated with vinegar or acetic acid, for if this is not done, every splash will mean a hole.

Incidentally, a hair brush must never be used with caustics, but one of fibre or glass-wool. Failing either, the odd quirks and corners in the loco body may be cleaned with a sharpened stick of hardwood. (When finished with, all the caustic should be disposed of down an outside drain, and the latter washed down with water).

Little Handling

After either benzine or caustic washing, the body should be handled as little as possible, so that grease from the pores of the fingers does not get upon its surface. It is a good idea to hold the body where possible between the thumb and forefinger, gripping the extreme edges of the footplate and allowing the boiler to occupy the space under the palm of the hand.

In any case, make a definite point of never touching any of the larger surfaces, such as the boiler, cab sidesheets or tender-sides, as these are already not easy to paint flat with a brush, without any extra problems arising from surface grease.

As regards the paint used, it may be said, truthfully that any really good undercoating may be used providing that it is strained through clean silk before use and that only pure spirit of turpentine is used to thin it somewhat. For the subsequent colour-coats, it is best to use those specially ground and matched by any of the several model firms advertising in these pages. It is not worth while to try and mix one's own.

Thinning Instructions

When using model paints be certain to adhere strictly to the maker's instructions in regard to thinning and methods of working and, above all, do not experiment! The makers have done all that for you.

When applying paint, always be certain to lay on sufficient at the corners and projecting angles (such as the rounded corner between the top of a Belpaire fire-box and the boiler-barrel) for paint has an odd habit of drawing away from corners and protruberances.

It is also a mistake to finish off a narrow edge (such as a footplate valance) by drawing the brush across a corner. Always finish off by pulling the brush down the whole length of the surface for its last stroke.

In all the painting work the reader will find his worst enemy is dust. It seems to be everywhere directly one decides to paint a model loco! The writer has found that out-of-doors is best, if it is a calm day, when the dust

A Suitable Hack-Saw

IF you happen to break a hack-saw blade, do not discard it. Take the best piece, fit it into an old handframe, and you will find you can use it for a considerable time in this way.

has been laid and the air cooled by a shower of rain.

The Best Place

Failing these *desirata*, a cool greenhouse or conservatory is excellent. But never, in any circumstances, attempt to get good results by working in any room where there is a carpet or where people are always going to and fro upon their lawful domestic occasions—such movements produce a veritable sandstorm!

Finally, never work in a coat, but with the shirt-sleeves rolled up high. This may sound facetious, but it is surprising the amount of dust which drops on to one's work from the coat-sleeve; which is always in movement as one works.

If a fast-drying paint is being manipulated, it is a good plan to wash occasionally the brush in pure turpentine, as otherwise the 'heel' of the former will gradually become charged with partly-set paint and lose its springiness and thus fail to lay on the colour evenly and without ripples. The brush—if a ¼in. or ⅜in. flat one—should be kept flat by loading it with paint occasionally and drawing it along a waste scrap of metal, which treatment helps to keep the hairs in good fettle.

Each individual surface should be painted individually, keeping all unavoidable joint-lines behind in the shadow, so that they are inconspicuous. Thus, breaks in the continuity of the footplate painting should be made where the splashers protrude, and in the case of outside-framed engines, the spring drop-hangers form a convenient point for a break-line.

Direction of Painting

Always work away from, rather than towards small projections such as lamp-irons, couplings and buffers. Never allow too much paint to run into right-angled crevasses and seams, as nothing 'gums up' the best of models easier than this simple mistake. Remember, too, that two thin coats are much better than one heavy, syrupy coat; which not only dries slowly, but effectively blinds out all the super-detail to which one has been put to such pains to faithfully model.

Hard First Coat

Allow the primer (undercoat) to dry thoroughly, and very carefully remove any 'knibs' or settled dust-flecks with the silk and flour emery, using the very lightest pressure possible during the process so that the bare metal is not exposed where the treatment has taken place.

The actual colour-coat or coats may now be applied in the same way, making each successive coat of a slightly different shade to the previous one, so that any inadvertant gaps may be detected instantly.

The model should be continually examined at all stages to ensure that every portion of its surface is covered. If any gaps are allowed to remain, it is completely impossible to cover them afterwards without their presence being detectable in the final coat. Time well spent will make the model worth while.

Invisible writing and novel cyphers can be used in

SOME SECRET CODES

IN days of old when civil war waged it was often necessary for leaders of opposing parties to write their letters in code or use 'invisible' ink in case the messenger was waylaid by enemies on the road. Codes and ciphers, of course, are still employed today in despatches concerning secret military information. During the war all governments maintained a special staff of highly skilled experts to decipher enemy documents or invent codes for their own use.

There are hundreds of ways of writing secret messages, and if you are interested here are a few notes on the subject. If you wish to send a letter to a friend which only he can read, here is a very novel method. Using a clean quill pen (make your own from a large feather), write your message in a solution of cobalt chloride. Although the words will appear green in colour when written, they will disappear if breathed upon and not reappear until your friend heats the sheet of paper.

A Burning Message

Equally novel is the following method. Into about half an eggcupful of water place sufficient saltpetre (obtainable from chemists) until the water refuses to dissolve any more. With the end of a wooden penholder write your message in the solution, being careful to join each word, and line of words or letters, to the next. The writing must be continuous.

Your friend (who is 'in the know') applies a red-hot matchstick to a pre-arranged starting point on the paper and a thin trail of fire like a smouldering fuse will burn its way along the path taken by your saltpetre 'writing', thus revealing the hidden message.

If you write or draw on coloured paper, using a solution of nitrate of bismuth as your 'ink', the work will be invisible when dry, but on damping, the lines will appear in white.

By writing with a weak solution of copper sulphate you can produce a secret message which requires the fumes of smelling salts (or a little liquid ammonia) to render visible. The writing can be rendered invisible again by holding the paper before a gentle heat.

So much for invisible inks. Now for a few codes and ciphers. Cut a long narrow strip of paper and wind it around a length of bamboo cane or broom handle as though you were putting on a puttee (i.e. overlapping each turn of paper slightly).

Now write your message along the length of the paper-draped rod and then unwind the paper. Arrange beforehand with your chum to have a rod of the same diameter as the one you used. By winding your strip of writing on to his stick carefully, he will be able to decipher the message.

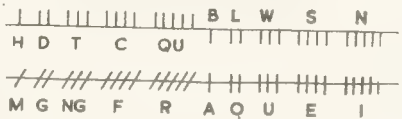
Alphabet Codes

There are countless variations of the following code. The alphabet is first written across a sheet of paper from A to Z. Underneath each letter in the top line substitute an alternative letter (or number) thus:

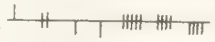
A B C D E F G H I J K L M N O etc.
D C B A K J I G F E O H L M N etc.

Using the above, the word BOOK would be written CNNO or the word LION thus: HFNM.

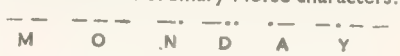
Ogham, an ancient form of Irish writing, will give you a simple but baffling code. Here is the alphabet, which contains twenty characters:



The word HOBBIES using the Ogham alphabet would be written:



The Morse code can be made more puzzling if the dots are placed above a line and dashes below. Here is the word MONDAY in ordinary Morse characters:



Here is the same word written the 'puzzling' way:

If you think that too difficult, make small 'mountains' for dots and large ones for dashes. Here is MONDAY by this method:

All these secret codes are interesting to work out and use in private correspondence, name marking, etc.

(206)

A PHOTOGRAPHIC ALPHABET

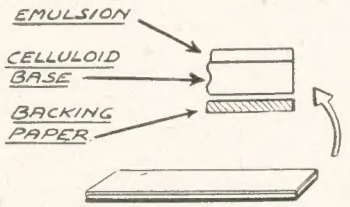
Short illustrated hints for the amateur. Look out for the remaining letters and notes.

E for—

EMULSION

'THE film' which we buy from the chemist tightly rolled on to a wooden or metal roller is made up of three distinct layers:—(1) The Backing paper, (2) 'Base' and (3) Emulsion.

The emulsion is the layer that does the work of taking the picture and is composed of some light-sensitive sale such as silver nitrate, suspended in a surround of collodion or a similar substance. This is run, when in a liquid state, on to the 'base' which is a strip of



transparent celluloid. The backing paper goes behind the two and is for protection.

Being light-sensitive means that a material reacts differently according to the *amount* of light that falls on it, and as an image of the scene outside is thrown on the emulsion of a film the picture is built up by the varying reaction of this to light and shade.

Emulsions vary a lot, some being more sensitive to light than others. Their sensitiveness is spoken of as 'speed' and the faster the film the greater its sensitivity. Most emulsions are sensitive to red rays (hence they can be developed by a red light) but others are sensitive to all rays, these being called 'panchromatic' (all colours).

ENLARGING

THIS is a very fascinating part of photography and is the making of big prints from little negatives. It is done by projecting a picture of the negative on to a sheet of sensitive paper in just the same way that a magic lantern throws a slide on the screen. The projection acts as would a negative of that size and so a big print is obtained on the paper.

There are three types of enlarger:—the horizontal, vertical and daylight. The horizontal is exactly similar to a magic lantern, with an easel upon which the picture comes standing in front just like a little screen. In a vertical enlarger the lens points downwards, the printing paper being laid horizontally on the base. This type is now very popular as it makes composition and the adjusting of the paper very easy.

The daylight enlarger is in the form of a box with the sensitive paper one end and the negative the other. Here a dark-room must be used for loading and the instrument is then taken out and pointed to the sky to make the exposure.

EXPOSURE

A BOOK could be written about exposures. The name covers the length of time that the light from the subject is allowed to play on the sensitised emulsion of the film. This time can be from the smallest fraction of a second to many minutes, everything depending on the actinic value of the light and the size of the lens opening.

Roughly all exposures fall into two groups 'Instantaneous' and 'Time'. The first means any exposure down to about $\frac{1}{20}$ second, the shutter just flashing across the lens, while the second may run into many minutes, the shutter opening and remaining open till the trigger is pressed again.

Most box cameras work at a standard rate of $\frac{1}{30}$ second for a snap, but by a slight adjustment, time exposure of any length can be given.

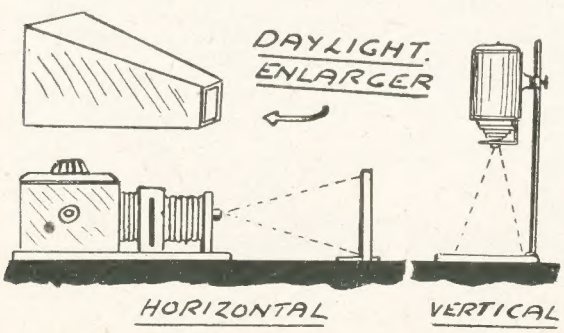
The best way to get exposures correct for various subjects and light strengths is to use one of the simple charts that are often given in the back of photographic diaries, etc.

F for—

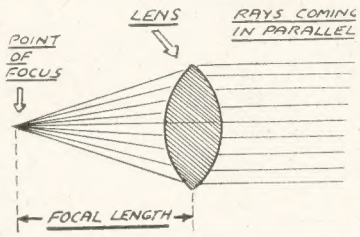
FOCAL LENGTH

THE focal length of a lens is a different thing to the f numbers which indicated the size of stop. It is a definite quality of a lens and does not differ with the stop numbers.

It is found by measuring the distance between the lens and film (the image being in sharp focus) when the rays entering the lens are parallel to one another, that is to say when the item focused is at infinity. In actual practice a subject at a few miles distance gives virtually parallel rays.



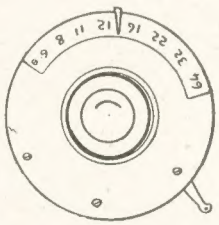
The main thing an amateur should know is that the longer the focal length of a lens the bigger the picture it will



give from any given position, the size varying in direct proportion to the focal length. Thus a 6in. lens will give twice the size of picture of a 3in. lens. Short focus lenses take up less space and give a greater 'depth of focus' than long focus and so they are most often used for miniature cameras.

'f-NUMBERS'

IN front of a camera you will see a small pointer which runs round a scale upon which are scribed f 8, f 11, f 16, etc. These are the 'stop' numbers and tell you the size of the opening in front of the lens through which rays are getting to the film. This opening can be changed in size by moving the pointer and the variation has the effect of controlling the amount of light passing. It also does one or two other useful things.



The figure shown means the number of times the diameter of the opening will go into the focal length of the lens (virtually the distance from glass to film). Thus f 8 means the diameter is $\frac{1}{8}$ of the focal length, f 16, $\frac{1}{16}$ and so on.

Smaller openings need more exposure and the variation is according to the square of the area of the openings concerned. For example, if an opening was twice as big as another, the smaller would require four times as much exposure.

FOG

THE only rays of light to reach the film in a camera should be those coming from the image. Sometimes rays get in some other way, as, say, through a hole in the bellows, and these blackening in the part on which they fall, appear on the print as white areas. The work of such vagrant light-rays is spoken of as 'fog'.

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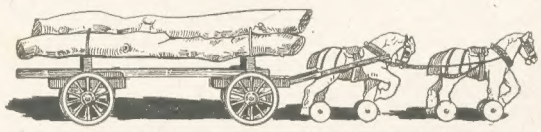

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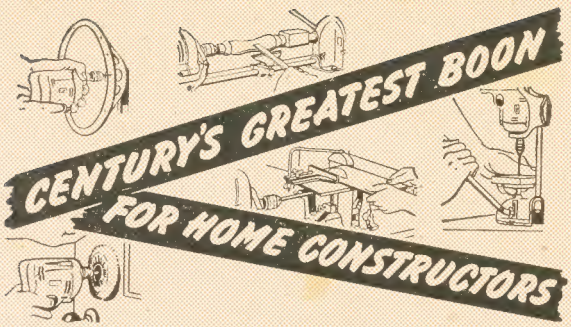

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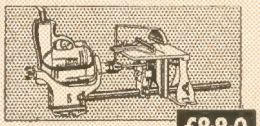

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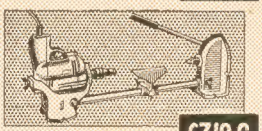

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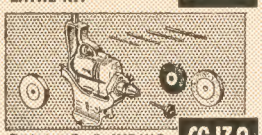

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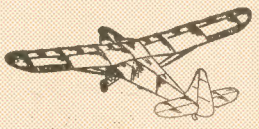

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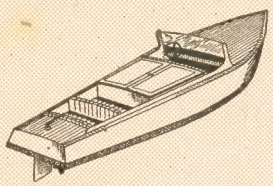

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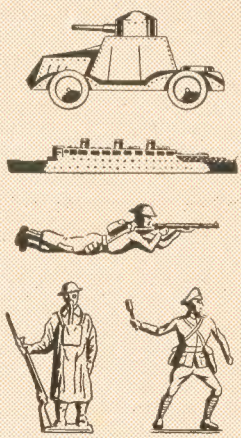

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